

AG 161: Introduction to Plant Science

CRNs: 20769/21604 | Semester: Fall, 2024 | Instructor: Erin Krier

~~*“I grow plants for many reasons: to please my soul, to challenge the elements or to challenge my patience, for novelty or for nostalgia, but mostly for the joy of seeing them grow.”—David Hobson*~~

“If I could choose just a single element of the traditional teachings that we’re called to pick up, it would be the teachings of the honorable harvest, which were taught us by the plants who give us everything that we need.” – Robin Wall Kimmerer: mother, scientist, professor, member of the Citizen Potawatomi Nation, author of Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants

Locations: Tuesday lecture – F-225

Thursday lab – M-106

Meeting Times: Lecture – Tuesdays 9:00 – 11:50 am

CRN 20769 Lab – Thursdays 9:00 – 11:50 am

CRN 21604 Lab – Thursdays 12:00 – 2:50 pm

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Mailbox located in M-207B; **Office** located in K-202

Office Hours: In K-202 and via Zoom Personal Meeting Room

<https://hancockcollege.zoom.us/j/erinkrierofficehours>

Mondays 10:30 am – 12:00 pm; Tuesdays 2:00 – 3:00 pm; Wednesdays 11:30 am – 1:00 pm;

Thursdays 4:00 – 5:00 pm; Fridays and other times available by appointment

Final Exam: December 5, 9:00 – 11:50 am, F-225

I. Course Description:

Introduction to plant science including structure, growth processes, propagation, physiology, growth media, biological competitors, and post-harvest factors of food, fiber, and ornamental plants.

II. Course Aims and Objectives:

Aims

I intend for ~~students~~ **you** to leave this class with the knowledge of plant growth processes necessary for success in agricultural production and crop protection **through the exploration of a meaningful connection to the world of plant life**. It is also my desire that students discover an appreciation for and awe of the Kingdom Plantae - with its diversity, value, ~~meaning~~, and inherent beauty.

Course Objectives:

Upon successful completion of the course, the student will be able to:

1. Categorize the roles of higher plants in the living world.
2. Describe the structural components of higher plants.
3. Explain the standard plant propagation methods.
4. Describe sexual and asexual reproduction in higher plants.
5. Explain photosynthesis, respiration, and translocation in higher plants.
6. Describe the physical and chemical properties of soils and soil erosion problems.
7. Describe the climatic influences on plant growth and development.
8. Categorize the biological competitors of higher plants.
9. Describe the scientific method and explain its application in solving problems in plant and soil science.

III. Methods of Evaluation: 1500 points possible to earn

1. Weekly Quizzes: 15 points each x 12 quizzes = 180 points total
 2. Personal Plant Project – select a plant of personal interest and/or a plant of cultural significance and create a demonstration project of your choice to share with the class the history, uses, ecological role, and other notable facts or stories. The project can be a cooked dish, photography, art, medicine, an item made from plant fiber, or anything that will help you demonstrate the meaning the plant holds for you. You may create an item, a presentation, a paper, etc. to be shared with the class = 200 points total
 3. Homework Assignments: 20 points each x 10 + 10 (survey) = 210 points total
 4. Cumulative Research Project/Paper – using the scientific method for research in the student garden field trial = 200 points total
 5. Lab Projects and Participation: 25 points each x 15 = 375 points total
 6. In-class only activities: 10 points each x (up to) 12 = (up to) 120 points total
- During the semester there will be activities during the class period that will be worth 10 points each. These points can only be earned in class during the class meeting in which the activity occurs. **Students who miss class on that day or who miss the part of the class meeting where the activity occurs will not have an opportunity to earn those points.** However, if a reason for the absence is communicated with me, you will not have a zero entered in the gradebook, so the missed in-class activity will not negatively impact your grade.
7. Final Exam in-class only review session: 25 points total
 8. Final Exam = 150 points total

IV. Student Learning Outcomes

1. AG161 SLO1 - Identify the importance and characteristics of higher plants.
2. AG161 SLO2 - Understand components and propagation in higher plants.
3. AG161 SLO3 - Associate photosynthesis, respiration and translocation with abiotic and biotic factors that modify them.

V. Texts and Other Instructional Materials:

1. Adopted Text:
 - a. McMahon, M.E., A.M. Kofranek, and G.E. Rubatzky. Plant Science: Growth, Development, and Utilization of Cultivated Plants, 5th Edition. Prentice-Hall, NJ, 2011.
2. Optional Ideas for Personal Plant Project:
 - a. Plants, People, and Culture: The Science of Ethnobotany; Balick, M. and Cox, P.
 - b. Braiding Sweetgrass: Indigenous Wisdom Scientific Knowledge and the Teachings of Plants; Kimmerer, R.
 - c. The Perfect Specimen: The 20th Century Renown Botanist Ynés Mexía; Anema, D.
 - d. The Botany of Desire: A Plant's-Eye View of the World; Pollan, M.
 - e. Where the Gods Reign: Plants and Peoples of the Colombian Amazon; Schultes and Plotkin, M.
 - f. The Vegetational History of the Oaxaca Valley and Zapotec Plant Knowledge; Smith, C. and Messer, E.
 - g. Wild Apples; Thoreau, H.
 - h. Our Fermented Lives: A History of How Fermented Foods Have Shaped Cultures & Communities; Skinner, J.
 - i. Plants and People of the Golden Triangle: Ethnobotany of the Hill Tribes of Northern Thailand; Anderson, E.
 - j. Goddesses, Elixirs, and Witches: Plants and Sexuality throughout Human History; Riddle, J.
 - k. Reinventing Hoodia: Peoples, Plants, and Patents in South Africa; Foster, L.
 - l. In Defense of Plants: An Exploration into the Wonder of Plants; Candeias, M.
 - m. The Struggle for Maize: Campesinos, Workers, and Transgenic Corn in the Mexican Countryside; Fitting, E.
3. Other Meaningful Materials:

- a. Robin Wall Kimmerer: 'Take What Is Given to You'; Bioneers | Published: September 21, 2017
<https://bioneers.org/robin-kimmerer-take-given-ztvz1709/#:~:text=If%20I%20could%20choose%20just,own%2C%20aren't%20we%3F>
- b. Marks, R. et al. A critical analysis of plant science literature reveals ongoing inequities | Proceedings of the National Academies of Science: 2023 March 7
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10013813/>
- c. Julia Cordero-Lamb, Coastal Band of the Chumash Nation. What Is, and What Can Be: Traditional Regenerative Horticulture in Syuxtun (Santa Barbara). Fall 2023.
<https://www.cnps.org/artemisia-journal/what-is-and-what-can-be-36500>
- d. Janick, Jules, Robert Schery, Frank Woods and Vernon Ruttan. Plant Science: An Introduction to World Crops, 3rd Edition. WH Freeman and Company, 1981.
- e. Gardner, Franklin, R. Brent Pearce and Roger Mitchell. Physiology of Crop Plants. Iowa State University Press, 1985.

VI. Tentative Course Schedule: Subject to change so that we remain flexible to student needs and adaptive to life's unforeseen interruptions! Some of these topics may be covered by a guest speaker or while on a field trip.

Date	Lecture Topic	Lab Topic	Assignment Given	Due Date
August 15, 17	Introduction to Plant Science	Introduction to plants and the student garden: sit with a plant	Write down ideas for research trial on abiotic and biotic factors	August 22
August 22, 24	The Scientific Method and Introduction to the Field Research Trial & Role of Higher Plants in the Living World through an Indigenous lens; View and discuss Tending Nature PBS video "Holistic Healing with the Syuxtun Collective"	Plan and design field trial; germination experiment; review Marks, R. et al. A critical analysis of plant science literature reveals ongoing inequities Proceedings of the National Academies of Science: 2023 March 7 – discuss plant science research trends; California Agriculture research journal to introduce academic research & scientific writing	Peer-reviewed journal and Indigenous articles assignment Read UCSC Community Herb Garden Guide "Healing Through Cultural and Ancestral Food & Medicine"	August 29
August 29, 31	Naming and Classifying Plants and Latin/historical meaning of their names AND Cultivated Plants	Plant ID and Classification – Dichotomous Plant Key	Crop Improvement assignment Select Personal Plant Project species and topic using worksheet	September 5
September 5, 7	Structure of Higher Plants, Part I – seeds, germination, roots	Seeds, Germination, Root Structures	Plant structure I assignment Work on Personal Plant Project	September 12
September 12, 14	Structure of Higher Plants, Part II – stems and leaves	Monocot & Dicot Stems and Vascular Tissue	Plant structure II assignment Prepare to present Personal Plant Project	September 19
September 19, 21	Structure of Higher Plants, Part III – flowers and fruit	Flowers and Fruit AND Personal Plant Project	Find and review a contribution made to	September 26

		presentations	the field of plant science research by an individual with whom you relate through culture, gender, religion, or other traits that form your sense of identity	
September 26, 28	The Plant Cell and Agricultural Applications	Plant Cells and Genetics	Start Research Paper Introduction, treatment I	October 3
October 3, 5	Plant Physiological Processes, Part I – Photosynthesis, Light-dependent Reactions	Light-dependent Reactions of Photosynthesis	Continue Research Paper Introduction, treatment II	October 10
October 10, 12	Plant Physiological Processes, Part II – Photosynthesis, Light-independent Reactions, C3/C4, CAM	Factors that Affect Photosynthetic Rate	Continue Research Paper Introduction, treatment III	October 17
October 17, 19	Plant Physiological Processes, Part III – Cellular Respiration	Cellular Respiration	Continue Research Paper Introduction, treatment IV	October 24
October 24, 26	Water and Nutrients in Plant Growth	Plant Nutrients	Soil microbiome assignment and worldwide Indigenous soil management practices	October 31
October 31, November 2	Biological Competitors of Crop Plants AND Indigenous Methods of Pest Management	Weed, Pathogen, Insect Collection	Biological Competitors ID assignment	November 7
November 7, 9	Environmental Factors Influencing Plant Growth	<i>Tentative</i> Field Trip	Work on research paper	November 30
November 14, 16	Phototropism and Photoperiodism	Field Trial Data Collection	Work on research paper	November 30
November 21	Phytohormones: Structure, Function & Agricultural Applications AND Plant Propagation	NO LAB – THANKSGIVING BREAK	Work on research paper	November 30
November 28, 30	Review and study guide compilation for Final Exam	<i>Tentative</i> Field Trip	Study for final exam	December 5
December 5	FINAL EXAM	Final assessment of field and greenhouse trials		Final Exam next week

VII. Tentative Field Trips and/or Guest Speakers

1. Plant propagation and/or plant breeding facility
2. Food safety plant science

VIII. Classroom Expectations

1. Please make every effort to be on time – the wonderful world of plants is full of fascinating information that we don't want to miss if we don't make the best use of our time together.
2. ~~This is NOT an online class! This class meets in person, on campus and I expect you to join us each week in order to connect with your fellow learners and me.~~

3. Engage in active participation – your presence in this class is **valuable**! Not only will you gain more from this class through active engagement, but the rest of us will also learn and grow from hearing your perspectives, your stories, your hopes, and your questions.

IX. Be Prepared for Student Farm Work

This class spends time working in the Allan Hancock College student garden and fruit orchard. Please come to class every week dressed in appropriate attire for such work: closed-toe shoes; jeans or other sturdy pants; tops to protect your skin; hats can be beneficial. Also bring water to drink. We will provide you with work gloves. Take every precaution to follow safe work practices.

X. Absence Policy

This class covers a lot of material each week so missing one class means you will miss an entire topic.

Attendance and participation are important for mastery of the course topics. However, I understand that life circumstances can prevent students from being able to attend every class. Although you are not required to provide me with the reason for your absence, as it may be personal in nature, please do communicate with me acknowledging that you will be or have been absent and we will work together to establish make up work. I honor and respect the need for you to miss class on occasion due to religious observances, cultural events, work commitments, family obligations, physical and/or mental health and wellness care. I encourage you to communicate with me regarding absences so that we can work together to accommodate your needs. ~~Three or more unexcused absences and a student may be dropped.~~ If you miss three or more classes without communicating with me, you may be dropped from the class. I will make every attempt to reach out to you if your attendance is of concern, but please communicate with me if you are not able to attend class.

XI. Late Work Policy

Late assignments and make-up quizzes will be accepted with the following conditions:

1. On the day that work is due or the quiz is taken, inform me why you are unable to have your work complete or attend class. If you do not turn in an assignment on time or join class for a quiz, please communicate with me to prevent loss of points for late or missing work.
2. If work is submitted late without prior communication with me, you may lose up to 10% of the points for every week the assignment is late. For example, if you submit a 25-point assignment late (without communicating with me) you may lose up to 2.5 points for every week that the assignment is late.
3. I will always accept late work up through the final week of regular instruction, although late points may be deducted as stated above.
4. If you have an emergency and cannot meet assignment expectations, please email, call, or text me and I will be glad to accept your late work without point deductions.

XII. Important Dates

Start Date: 14-AUG-2023

Last Date to drop with a refund: 25-AUG-2023

Last Date to drop without a "W": 27-AUG-2023

Last Date to add class: 27-AUG-2023

Census Roster Due Date: 27-AUG-2023

Last date to choose Pass/No Pass: 15-SEP-2023

Last Date to drop with a "W": 04-NOV-2023

End Date: 07-DEC-2023

XIII. Americans with Disabilities Act

Any personal learning accommodations that may be needed by a student covered by the Americans with Disabilities Act (ADA) must be made known to the instructor as soon as possible. This is the student's responsibility. Information about services, academic modifications and documentation requirements can be obtained from the Learning Assistance Program (LAP).

For more information about services available to AHC students with disabilities, contact:

(805) 922-6966 ext, 3274 (Santa Maria Campus)
(805) 922-6966 ext, 5274 (Lompoc Valley Center from Santa Maria)
(805) 735-3366 ext, 5274 (Lompoc Valley Center from Lompoc)

XIV. The Basic Needs Initiative

Are you having trouble with getting enough food for yourself or your family? Have an unexpected financial emergency come up? Connect with the Basic Needs Initiative in Building G Room 101 for resources to help support you. The Basic Needs Center at Allan Hancock College acts as a resource hub to assist the Allan Hancock College Community experiencing basic needs insecurities in identifying and accessing support services on-campus and in the community. The center can help connect you with food & housing resources, emergency grants, and other supports that may benefit your situation. If you or someone you know at Allan Hancock College is experiencing any type of financial hardship or basic need insecurity, use the contact information below to get in touch with someone to provide support.

Call: (805)922-6966 ext.3927 | Location: G-101

Email: basicneeds@hancockcollege.edu

Website: <https://www.hancockcollege.edu/basicneeds/index.php>

XV. Student Support and Services

From assistance for undocumented, veteran, formerly incarcerated, foster students, and/or first-generation scholars to health and financial services and academic success programs, AHC Student Services is here for you!

Website: <https://www.hancockcollege.edu/studentsservices/index.php>